Medical Textiles with embedded Optical Fibre Sensors for Healthcare Monitoring during MRI

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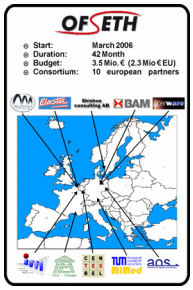
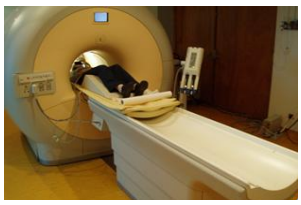
BACKGROUND and BASICS

- Healthcare monitoring is a general concern for patients requiring a continuous medical assistance and treatment. In order to increase mobility of such patients, a huge effort is pursued worldwide for the development of wearable monitoring systems able to measure vital physiological parameters

- The European research project **Optical Fibre Sensors Embedded into technical Textiles for Healthcare (OFSETH)** supported by the EU 6 Framework programme takes advantage of pure optical sensing technologies for extending the capabilities of medical technical textiles for wearable health monitoring, especially in MRI (Magnetic Resonance Imaging) environments.

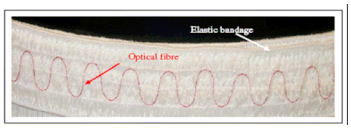


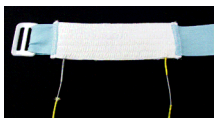


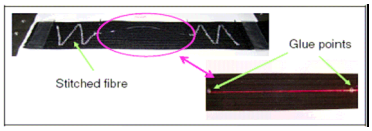
CONCEPT and SOLUTION

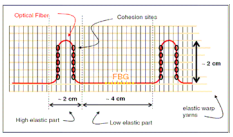
Advantages of fibre optic sensors:

- No metallic or electrical parts which can disturb the MRI and burn the patients skin
- Optical fibers can ideally be processed like standard textile yarns with standard techniques, such as wrap and weft knitting, weaving and stitching
- Sensor can be remotely interrogated via an optical cable with the monitoring unit located out of the MRI field







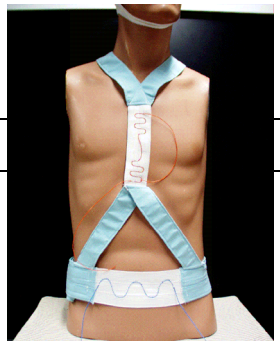


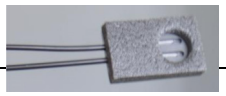
Respiration sensor:

- MRI compatible
- Comfortable to wear
- Rapid installation
- OTDR and Macrobending sensors for measuring abdominal movements
- FBG sensor for thoracic movements

Pulse oximetry sensor:

- MRI compatible
- Remote illumination and interrogation through optical fibre





STATUS and OUTLOOK

- Different respiration sensors were developed and tested in laboratory
- An improved SpO2 sensor is under development
- Clinical test for sensor optimization and validation are planed

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